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18/EN 605/002
Mechatronics Engineering

$T_{\text{actual at 5min}} = 25^{\circ}\text{C}$
thermometer reading at 5min = 20°C

$$\frac{dT}{dt} = kt$$

$$T = T_0 e^{kt}$$

 $t=0 \quad T = 10^{\circ}\text{C}$

$$10 = T_0 e^{k(0)}$$

$$10 = T_0$$

$$T = 10 e^{kt}$$

at 5min $T = 20^{\circ}\text{C}$

$$20 = 10 e^{k(5)}$$

$$\frac{20}{10} = e^{5k}$$

$$\ln 2 = 5k$$

$$\frac{0.6931}{5} = k \quad k = 0.139$$

$$T = 10 e^{0.139t}$$

time for thermometer to reach 24.9°C

$$24.9 = 10 e^{0.139t}$$

$$\frac{24.9}{10} = e^{0.139t}$$

$$2.49 = e^{0.139t}$$

$$\ln 2.49 = 0.139t$$

$$\frac{0.9123}{0.139} = t$$

$$t = 6.56$$

≈ 7 minutes



```
Editor - C:\Users\UKAY\Documents\MATLAB\mathquiz.m
gAdfile.m mathquiz.m
- commandwindow
- clear
- clc
- close all
- format short g
- mdata = xlsread('onlinequizdata.xlsx','fluiddata')
- x = mdata(1:2:250,1)
- y = mdata(1:2:250,2)
- plot(x,y)
- grid on
- grid minor
```

Command Window

```
999.99
999.99
999.99
999.99
999.99
999.99
999.99
999.99
999.99
999.99
1000
1000
1000
1000
1000
```

